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Original Article

Anatomical and Visual Outcome of Rhegmatogenous Retinal Detachment Managed with Scleral Buckling at a Tertiary Eye Centre in Nepal

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Abstract

Objective: To study the anatomical status and visual outcome of scleral buckling surgery in rhegmatogenous retinal detachment (RRD) at tertiary eye care center in Nepal. **Method**: This is a prospective, noncomparative, consecutive, interventional study of rhegmatogenous retinal detachment managed with scleral buckling surgery performed in Lumbini Eye Institute, Nepal. All the patients underwent surgery by a single experienced surgeon and had at least 3 months follow up. **Result**: A total of 50 patients(50 eyes) were operated, 38 males and 12 females, with a mean age of 39.46. Retinal reattachment was achieved in 46 (92%). Improved best corrected visual acuity (BCVA) was seen in 84%, whereas in 8% BCVA was same and deteriorated in another 8%. **Conclusion**: Rhegmatogenous retinal detachment is one of the common causes of visual impairment and blindness. Timely surgical management with scleral buckling surgery can give good anatomical and visual outcome.

Key words: retinal detachment, scleral buckling, vitrectomy, pneumatic retinopexy

Introduction

Rhegmatogenous retinal detachment (RRD) has an annual incidence of approximately 12.4 cases per 100,000 population. (Haimann MH et al, 1982) Retinal detachment surgery is one of the most commonly performed vitreoretinal procedure (Ah-Fat FG et al, 1999) and all the techniques are being continuously refined. There are three main techniques to manage RRD: scleral buckling (SB), pars plana vitrectomy(PPV) and pneumatic retinopexy (PR). Although most of the RRD cases could be managed with SB, there is an increasing trend towards using PPV(Ah-Fat FG et al, 1999, Schwartz et al, 2013). With the improvement in surgical techniques, instruments and materials that have been going on for the retinal reattachment surgery, SB might become a lost art, especially with newly trained retinal surgeons. Primary vitrectomy is currently the most common procedure used for the treatment of RRD (Schwartz et al, 2013).

In this study, we studied anatomical status and visual outcome of scleral buckling surgery in RRD.

Conflicts of Interest: Nil
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Materials and methods

This is a prospective, non-randomized, consecutive, interventional study conducted

at the retina clinic of Lumbini Eye Institute, Nepal. A total of 50 consecutive patients were enrolled for the study. Inclusion criteria included patients with RRD. Exclusion criteria included patients with proliferative vitreoretinopathy (PVR) grade C or more, significant media opacity and presence of other significant ocular abnormality like glaucoma. Pre-operative work-up included best corrected visual acuity (BCVA) anterior segment examination, intra ocular pressure (IOP) and posterior segment evaluation. All surgeries were performed by a single experienced surgeon.

Surgeries were performed under peribulbar anesthesia, except for children below 15 years of age who needed general anesthesia. A 360-degree conjunctival peritomy was performed and episcleral tissue cleared to hook the recti muscles. Breaks were localized by indirect ophthalmoscope and marked on the sclera. Breaks were treated with cryotherapy by gently indenting the sclera with the tip of the cryoprobe and freezing continued until the break was surrounded by a 2 mm margin of ice. Segmental silicon buckle was sutured temporarily to the sclera to achieve adequate buckle height with mattress type suture. A 240 band was used for encircling and tightened with a Watzke sleeve. Drainage of sub-retinal fluid was done if required using scleral cut-down technique. Indirect ophthalmoscopy was repeated to check if breaks were flat on the buckle. Intravitreal injection of sterile air was done in cases where sub-retinal fluid was not drained or if the sub-retinal fluid appeared significant. Mattress sutures (5-0 polyester) were then permanently tightened and peritomy closed.

Post-operative examination included BCVA, IOP, anterior segment examination and fundus evaluation under mydriasis. Topical antibiotics and steroids were applied postoperatively for 1 month along with cycloplegic drops for initial 1 week. Follow up was done at day one, one month and three months postoperativety. Primary outcome included anatomical attachment of retina and secondary outcome included BCVA. Patients were advised to follow up for minimum of three months after their surgical procedure.

Results

There were total 50 eyes of 50 patients with a mean age of 39.46 ± 18.41 (12 to 79 years), ranging from 12 to 79 years. Male 38 (76%) outnumbered female 12 (24%) patients, with the involvement of the right eye 29 (58%) predominating the left 21 (42%).

Past history of cataract surgery was present in 22(44%) of the cases, 22 9 (44%) had associated myopia, while others had a remote history of ocular trauma 20 (40%) and 3 (6%) had YAG laser capsulotomy done.

Of the retinal breaks, horseshoe tear was the commonest 26 (52%), followed by retinal hole 11 (22%) and retinal dialysis 8 (16%). The commonest location of the retinal break was superotemporal (38%) and macula was detached in 92%.

At the end of 3 months, retina was attached in 46(92%). The final BCVA improved in 84% of the cases, remained same in 8%, while another 8% showed further deterioration in comparison with the initial BCVA at the time of presentation (Table 1). None of the patients underwent a second surgery.

RD, retinal detachment; UCVA, uncorrected visual acuity; BCVA, best corrected visual acuity; PL, perception of light; NPL, no perception of light.

SPSS software was used for statistical analysis.

Discussion

RRD is a potentially blinding ophthalmic condition caused by a separation of the neurosensory retina (NSR) from the underlying retinal pigment epithelium (RPE) associated

with accumulation of fluid within this potential space. RRD was considered the untreatable condition in the past until the introduction of SB by Charles Schepens in 1951(Ah-Fat FG et al, 1999). Improvements continued in the surgical techniques with the introduction of pars plana vitrectomy (PPV) by Robert Machemer in 1970 and PR by Hilton and Grizzard in 1986. At present, all three techniques are used successfully for the treatment of RRD, with primary success rates of up to 90%. (E. Hatef et al, 2015)

Despite comparable success rates, with the modernization of vitrectomy machines, the introduction of wide angled viewing system and smaller gauge instrument, PPV has become the choice of RD surgery for many vitreoretinal surgeons. The modern vitreoretinal surgery with primary vitrectomy is limited by higher surgical cost and longer learning curve. The use of intraocular tamponade in the form of gas, oil or heavy liquid requires post-operative head positioning for good surgical results. But it may not be feasible in all patients, particularly in children and mentally compromised individuals. Also, an additional procedure is needed like the removal of silicon oil or heavy liquid and the rate of cataract formation is higher with PPV (Azad RV et al, 2007).

Table 1: Clinical characteristics of the study population.

Clinical parameters	**Frequency**	**Percent**	
Configuration of RD			
Total detachment	23	46	
Partial detachment with macular involvement	23	46	
Partial detachment without macular involvement	4	8	
Type of retinal break			
Horse shoe tear	26	52	
Retinal hole	11	22	
Retinal dialysis	8	16	
No break seen	5	10	
Anatomical outcome			
Status of retina	**Follow up**		
	Day 1 N (%)	1 month N (%)	3 months N (%)
Attached	48 (96)	46 (92)	46 (92)
Detached	2 (4)	4 (8)	4 (8)
Visual outcome			
Visual acuity	**Follow up**		
	Preoperative BCVA, N (%)	1 month BCVA, N (%)	3 months BCVA, N (%)
6/6-6/18	2 (4)	1 (2)	2 (4)
<6/18-6/60	1 (2)	11 (22)	17 (34)
<6/60-3/60	1 (2)	8 (16)	9 (18)
<3/60-1/60	12 (24)	11 (22)	9 (18)
<1/60-PL	34 (68)	19 (38)	13 (26)
NPL	0	0	0

PR also requires the use of intravitreal injection of gas along with cryotherapy or laser therapy to treat the retinal breaks followed by post-operative positioning of the head, where there is always an anticipation of the additional procedure if the patient compliance fails. PR is usually limited to cases where one or more retinal breaks are located within one-clock hour retinal arc in the upper two-thirds of the retina and significantly clear media to rule out the presence of other retinal breaks. (P. E. Tornambe et al, 1989)

The fundamental principle of RRD surgery is the release of the vitreoretinal traction and there is an obvious difference in achieving this goal between SB and PPV. Releasing this traction internally with PPV may be more difficult in young individuals with a formed vitreous body with no detachment of the posterior cortical vitreous. (Blindbaek S et al, 2015) This could result in iatrogenic retinal breaks, increasing the risk for PVR. An external approach with placement of a buckle element, thereby relieving the vitreous traction and supporting the retinal break(s) without the direct manipulation of a tight vitreo-retinal adhesion, has several advantages, with decreased risk and morbidity. SB still seems to surpass vitrectomy in the treatment of phakic RRD. (Azad RV et al, 2007) Pseudophakic RRD has been associated with poorer prognosis as compared to phakic detachments. (Christensen U et al, 2005) This has been attributed to lower preoperative visual acuity, higher incidence of total and macula-off RDs, and less frequent identification of retinal breaks. In our study, pseudophakic and aphakic RRDs comprised 44% of the total cases but these eyes did not differ from their phakic counterparts in terms of anatomical and visual outcomes. In the PARD study, pseudophakic/aphakic eyes were randomized to scleral buckling or primary vitrectomy but no significant difference was found in the anatomical success rates after 6 months. (Ahmadieh H et al, 2005)

The primary success rate of our study was 92%. Retinal reattachment could not be achieved in 8% patients owing to late presentation and presence of multiple breaks.

Chronicity of RD has been reported as a poor prognostic indicator for reattachment surgery. (James M et al, 2007) The duration of RD was more than 3 months in 36% of eyes in our study. Factors that seem to hinder retinal reattachment in these eyes are retinal shortening and high viscosity of the sub-retinal fluid. Presence of multiple retinal breaks is an additional risk factor for the development of PVR (Asaria RH et al, 2002), which is again a risk for failure of primary surgery. Pre-operative PVR of more than grade C1 and multiple retinal breaks are the predictive factors that influence retinal reattachment. (Afrashi F et al, 2005)

Functional improvement in visual status was noted in 42 cases (84%), 4 cases (8%) remained the same and 4 cases (8%) revealed deterioration in final BCVA. Although anatomical success rates have improved considerably since SB was introduced, there is little evidence that post-operative visual acuities have improved as a result of the technique. This is because postoperative visual acuity continues to depend primarily on pre-operative factors, most of which are beyond the control of the surgeon. The visual outcome depends primarily upon the extent of macular damage caused by the detachment. In most series, 37% to 56% of successfully treated eyes obtain a postoperative vision of at least 20/50. (Custodis E, 1952) Comparatively, the poorer visual outcome in cases of RD with macula-off following SB is due to more macular damage than in RD with macula-on. (Diederen RM et al, 2007) We had 92% cases with macula-off but most of the cases had visual improvement by 2 to 3 lines. Macular detachment also has been found to adversely affect anatomic outcomes of surgery. (Salicone A et al, 2006)

Limitation of this study is that it was a

noncomparative study. Comparative trials with more number of patients and longer follow up is need to consolidate the results.

Conclusion

RRD is a common cause of blindness which can be managed by SB. SB is a less expensive technique with fewer complications which provides good anatomical reattachment of retina and improvement of visual acuity. The results of SB are comparable with other techniques in both phakic and pseudophakic/aphakic group. In a developing country like ours, where cost-effectiveness matters a lot for both the patients and the health care provider SB is definitely the preferred method for the management of RRD.

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